

A. Engine 615, 616 M-injection pump with pneumatic governor

Standard version

Injection pump with governor and delivery pump for operating at altitudes up to 2000 m above sea level

Model	Engine	Injection pump Bosch designation (abbreviation)	Governor Bosch designation	Delivery pump Bosch designation	Control rod path including compensating path ¹⁾ mm	Test values ²⁾ MB-sheet Date or edition
115.1	615.912	PES 4 M 55 C 320 RS 47 (M)	EP/MN 60 M 23 DR	FP/K 22 M 13	14.8–15.0 ⁴⁾	2,2 a 5. 1972
	615.913	PES 4 M 50 C 320 RS 14 (M)	EP/MN 60 M 25 DR		14.9–15.0	2,0 a 4th edition
123.1	615.940	PES 4 M 50 C 320 RS 59 (M)	EP/MN 60 M 45 DR	FP/K 22 M 14	14.4–14.5	2,0 d 4th edition
	615.941	PES 4 M 55 C 320 RS 60 (M)	EP/MN 60 M 44 DR		14.3–14.4	2,2 f 3rd edition
115.1	616.916 ³⁾	PES 4 M 55 C 320 RS 47 (M)	EP/MN 60 M 38 DR EP/MN 60 M 39 DR ⁴⁾	FP/K 22 M 13	15.2–15.3	2,4 a 3rd edition
123.1	616.912	PES 4 M 55 C 320 RS 60 (M)	EP/MN 60 M 46 DR	FP/K 22 M 14	14.8–14.9	2,4 d 4th edition

Engine 615 for operating at altitudes above 2000 m above sea level

115.1	615.912	PES 4 M 55 C 320 RS 47 z (M)	EP/MN 60 M 23 DR	FP/K 22 M 13	13.9–14.1 ⁵⁾	2,2 a 5. 1972
	615.913	PES 4 M 50 C 320 RS 14 z (M)	EP/MN 60 M 25 DR		14.2–14.3	2,0 a 4th edition

¹⁾ Data concerning control rod path represent the path of the control rod from full load stop to outermost stop position. By means of these data for the control rod and compensating path, the injection pump can be regulated occasionally and in an emergency without a test bench.

²⁾ **Accurate regulation and adjustment of injection pump is possible on an injection pump test bench only.** For workshops which own such a test bench, the required data sheets for the various pumps are available.

³⁾ In the event of replacements, (USA) version vehicles are supplied with injection pumps model year 1975/76 only.

⁴⁾ Replaced by M 38 DR when stocks were used up.

⁵⁾ On engines with injection nozzles DN 0 SD 1510, as a result of the shorter compensating path, the control rod path amounts to 14.5–14.7 mm and on injection pumps for altitudes above 2000 m it is 13.6–13.8 mm.



Identification: Full load stop screw and governor housing lead-sealed.

Model year 1975/76

115.1	615.912	PES 4 M 55 C 320 RS 47 (M)	EP/MN 60 M 27 DR	FP/K 22 M 13	14.2–14.4	2,2 c 1st edition
	615.913	PES 4 M 50 C 320 RS 14 (M)	EP/MN 60 M 28 DR		14.2–14.3	
	616.916	PES 4 M 55 C 320 RS 47 (M)	EP/MN 60 M 40 DR		14.5–14.6	2,4 a 3rd edition

Model year 1977/78

Model	engine	Injection pump Bosch designation (abbreviation)	Governor Bosch designation	Delivery pump Bosch designation	Control rod path including compensating path ¹⁾ mm	Test values ²⁾ MB-sheet Date or edition
123.1	615.941	PES 4 M 55 C 320 RS 60 (M)	EP/MN 60 M 48 DR	FP/K 22 M 14	13.8–13.9	2,2 g 1st edition
	616.912	PES 4 M 55 C 320 RS 60 (M)	EP/MN 60 M 47 DR		14.5–14.7	2,4 g 2nd edition

Model year 1979

123.1	615.941 ³⁾	PES 4 M 55 C 320 RS 60 (M)	EP/MN 60 M 48 DR	FP/K 22 M 14	13.8–13.9	2,2 g 1st edition
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¹⁾ Data concerning control rod path represent the path of the control rod from full load stop to outermost stop position. By means of these data for the control rod and compensating path, the injection pump can be regulated occasionally and in an emergency without a test bench.

²⁾ **Accurate regulation and adjustment of injection pump is possible on an injection pump test bench only.** For workshops which own such a test bench, the required data sheets for the various pumps are available.

³⁾ Up to February 1979.

USA

Identification: green information plate.

Model year 1975/76

115.1	616.916	PES 4 M 55 C 320 RS 58 (M)	EP/MN 60 M 41 DR	FP/K 22 M 13	14.0–16.0	2,4 b 4th edition
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¹⁾ Data concerning control rod path represent the path of the control rod from full load stop to outermost stop position. By means of these data for the control rod and compensating path, the injection pump can be regulated occasionally and in an emergency without a test bench.

²⁾ **Accurate regulation and adjustment of injection pump is possible on an injection pump test bench only.** For workshops which own such a test bench, the required data sheets for the various pumps are available.

Test values

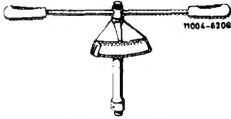



Engine	615.912/941	615.913/940	616
Begin of delivery before TDC in compression stroke ¹⁾ ²⁾	24°	26°	24°

¹⁾ The injection pump is in begin of delivery position, when the marking line on camshaft of injection pump is in alignment with line on flange of injection pump.

²⁾ The begin of delivery position is checked and set following installation of injection pump according to overflow method (07.1–110/115).

Tightening torques	Engine	Nm
Pipe connection for pressure valves	615, 616	35
Injection lines	615, 616	25

Special tools

Torque wrench 1/2" square, 15–65 Nm		000 589 27 21 00
Socket wrench insert 13 mm, 3/8" square		000 589 21 07 22
Box wrench insert open, 17 mm, 1/2" square for injection lines		000 589 68 03 00
Overflow pipe		636 589 02 23 00

Note

If lower fastening nut of injection pump (oil filter flange without recess) is poorly accessible, unscrew upper fastening screw from oil filter flange first. For this purpose, remove lefthand front wheel and unscrew fastening screw by means of an extended socket wrench. In addition, on engines 615.912 and 616, unscrew oil hoses from air-oil cooler on oil filter top.

Starting with the following chassis end numbers, an oil filter flange with recess is installed for better access to bottom fastening nut of injection pump on models 115.

Series production

Model	Starting chassis end no.
115.115	098110
115.110	200205

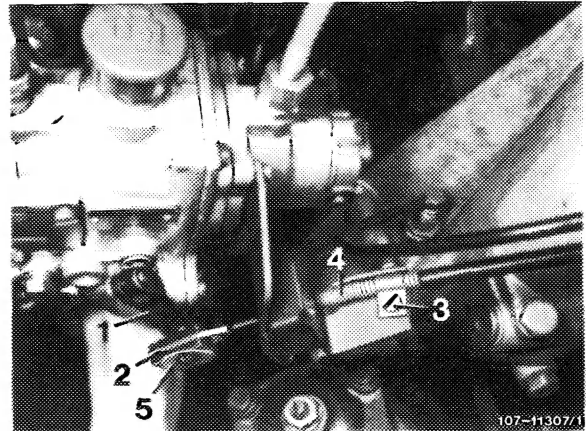
Removal

1 Unscrew injection lines, vacuum line and fuel lines on injection pump. Plug closing caps on connections for injection lines and fuel hoses on injection pump.

2 Disconnect connecting rod on tickler.

3 Disconnect start-stop cable control on adjusting lever (1) of injection pump. For this purpose, remove cotter pin, washer (5), screw (3) on angle bracket and remove wire coil (4) with clamp.

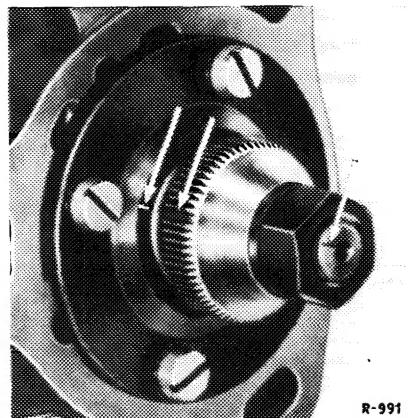
- 1 Adjusting lever
- 2 Oblong eye
- 3 Screw — angle bracket
- 4 Wire coil
- 5 Washer



4 Unscrew hex nut on supporting bell and fastening nuts of injection pump, then pull injection pump out of cylinder crankcase. Remove coupling sleeve from driver of injection pump or from drive shaft.

Note: When replacing a driver, apply counterhold for loosening hex nut by means of notched tooth wrench, then pull driver from injection pump shaft by means of puller. Clean shaft stub and driver; the two cones should be absolutely clean and free of grease.

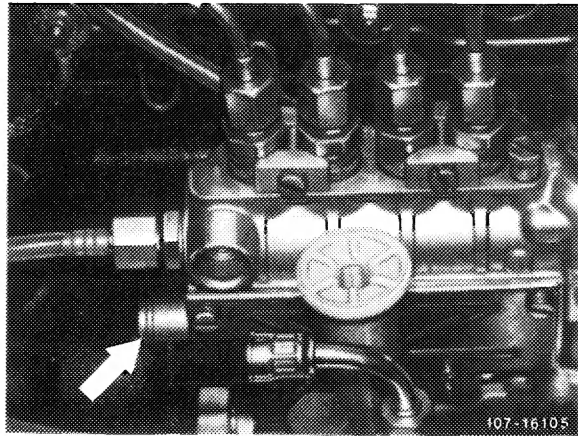
When mounting a new driver, pay attention to Woodruff key and markings (arrows).



Installation

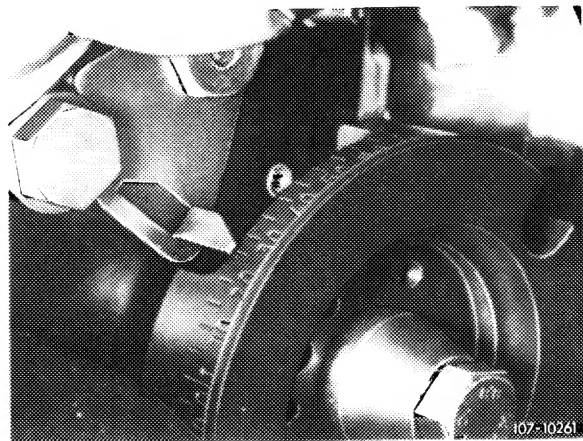
Prior to installing injection pump, check control rod for easy operation. If required, make operable as follows:

- a) Remove closing cap (arrow) of control rod.
- b) Push adjusting lever from stop to start position. Control rod should return automatically.
- c) If control rod is hard to move, which is caused by resinification, fill clean gasoline into fuel feed connection and permit to act for a short period on elements.
- d) Move control rod back and forth until it is freely operating.



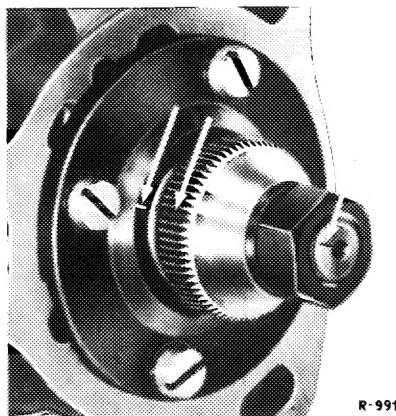
5 Set crankshaft to the following values in compression stroke of first cylinder.

615.913/940	26° before TDC
615.912/941	24° before TDC
616	24° before TDC



6 Slip coupling sleeve on intermediate gear shaft.

7 Set injection pump to begin of delivery. For this purpose, rotate pump shaft until tooth gap on driver and marking on injection pump are in alignment (arrows).



8 Mount new gasket.

9 Introduce injection pump in such a manner that the studs are in **center** of oblong holes (slots). This will permit swivelling in both directions for precision adjustment.

Note: Following precision adjustment, a distance of approx. 80 mm should be available from cylinder crankcase to center of pipe connection for injection lines to remove glow plugs.

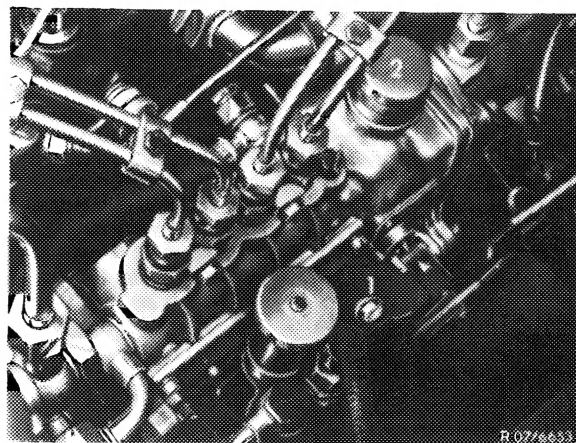
10 Mount washers and slightly tighten injection pump by means of hex nuts.

11 Check begin of delivery and adjust (07.1–110 and 115).

12 Tighten fastening nuts on front flange and on supporting bell.

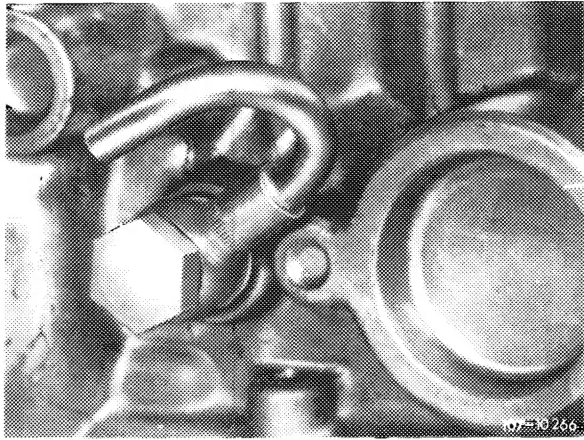
13 Check oil level of injection pump and correct, if required. For this purpose, unscrew check plug (1). If oil level is too high, loosen governor cover and raise slightly so that the fuel-oil mixture can flow out. When the oil level is too low, unscrew filter (2) and add engine oil up to check bore.

- 1 Check plug
- 2 Filter

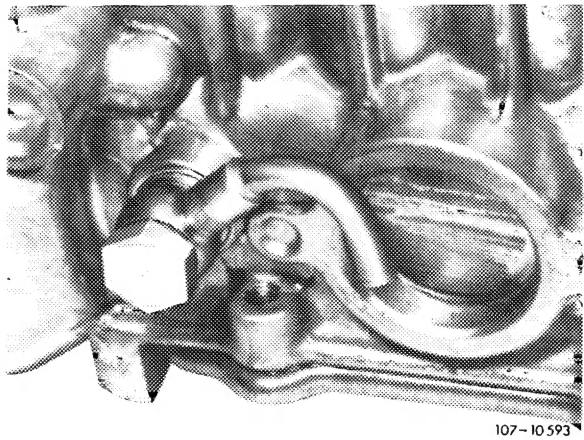


14 Check position of overflow pipe and correct according to illustration, if required. For this purpose, loosen hollow screw and correct overflow pipe according to illustration.

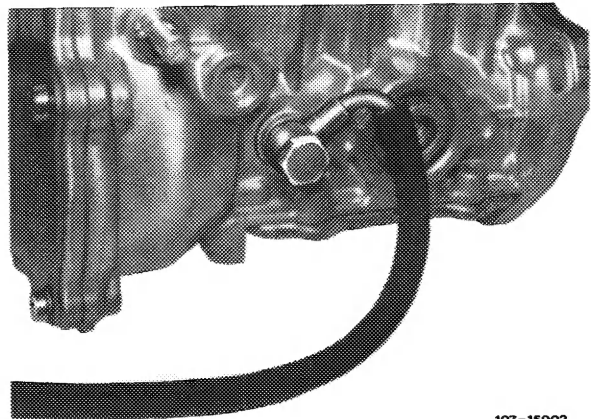
1st version



2nd version



3rd version



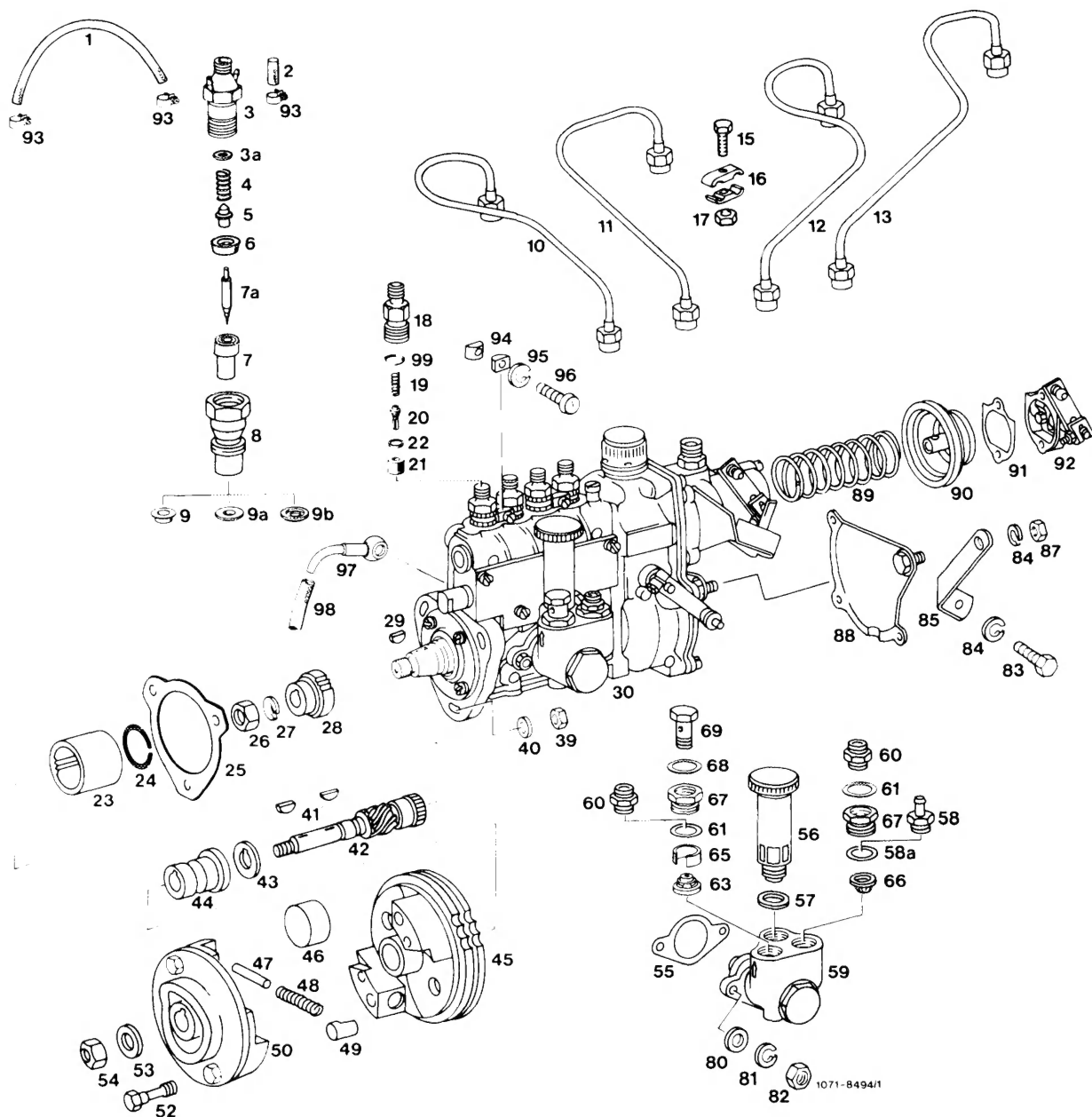
15 Mount start-stop cable control and adjust (07.1—340).

16 Run engine and check all connections for leaks.

17 Check idle speed and adjust, if required (07.1—100).

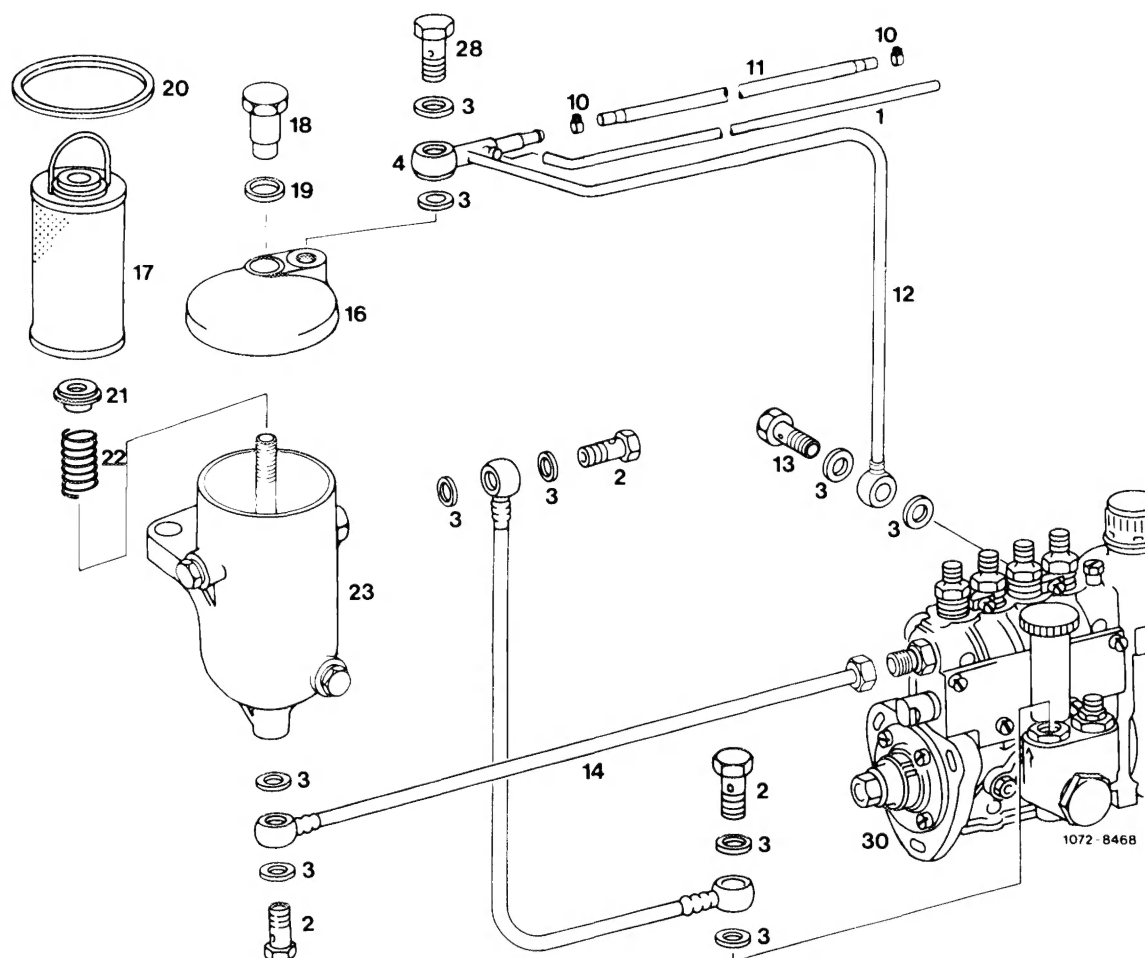
Mixture preparation

Engine 615, 616 M-injection pump with pneumatic governor



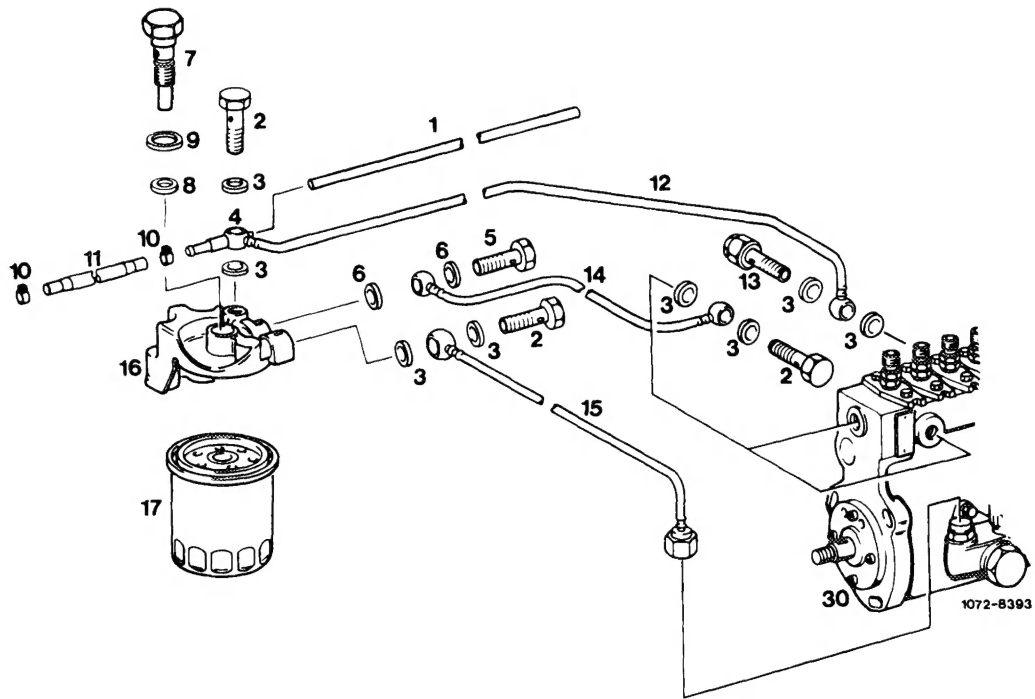
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|-----------------------------------|--------------------------------|------------------------------|
| 1 Leak hose | 25 Gasket | 61 Sealing ring |
| 2 Closing plug | 26 Nut | 63 Delivery valve |
| 3 Injection nozzle holder top | 27 Snap ring | 65 Holder |
| 3a Steel washer | 28 Drive pinion | 66 Suction valve |
| 4 Compression spring | 29 Woodruff key | 67 Screw connection |
| 5 Pressure pin | 30 Injection pump | 68 Sealing ring |
| 6 Nozzle holder insert | 39 Nut | 69 Hollow screw |
| 7 Nozzle body | 40 Washer | 80 Washer |
| 7a Nozzle needle | 41 Woodruff key | 81 Snap ring |
| 8 Injection nozzle holder bottom | 42 Intermediate gear shaft | 82 Nut |
| 9 Small nozzle plate 1st version | 43 Thrust ring | 83 Screw |
| 9a Small nozzle plate 2nd version | 44 Bushing | 84 Snap ring |
| 9b Small nozzle plate 3rd version | 45 Segment for injection timer | 85 Fastening bracket |
| 10 Injection line | 46 Governor weight | 87 Nut |
| 11 Injection line | 47 Bolt | 88 Fastening bell |
| 12 Injection line | 48 Compression spring | 89 Governor spring |
| 13 Injection line | 49 Bolt | 90 Diaphragm |
| 15 Screw | 50 Segment flange | 91 Gasket |
| 16 Pipe holder | 52 Collar screw | 92 Poppet housing |
| 17 Nut | 53 Washer | 93 Hose clamp Sweden version |
| 18 Pipe connection | 54 Nut | 94 Clamping jaw lock |
| 19 Compression spring | 55 Gasket | 95 Snap ring |
| 20 Delivery valve | 56 Fuel manual delivery pump | 96 Screw |
| 21 Pressure valve carrier | 57 Rubber sealing ring | 97 Overflow pipe |
| 22 Copper sealing ring | 58 Connection | 98 Hose |
| 23 Sleeve | 58a Sealing ring | 99 O-ring |
| 24 Circlip | 59 Fuel delivery pump | |
| | 60 Screw connection | |

Fuel filter
Engine 615, 616 in model 115.1



- | | | |
|---------------------------------|------------------------|--------------------------------------|
| 1 Leak hose of injection nozzle | 13 Overflow valve | 20 Rubber sealing ring |
| 2 Hollow screw | 14 Fuel line | 21 Spring plate |
| 3 Sealing ring | 15 Fuel line | 22 Compression spring |
| 4 Ring fitting | 16 Fuel filter top | 23 Fuel filter bottom |
| 10 Hose clamp | 17 Fuel filter element | 28 Hollow screw with calibrated bore |
| 11 Fuel expanding hose | 18 Screw | 30 Injection pump |
| 12 Return line | 19 Sealing ring | |

Engine 615, 616 in model 123.1



- 1 Leak hose of injection nozzle
- 2 Hollow screw with calibrated bore
- 3 Sealing ring
- 4 Ring fitting
- 5 Hollow screw
- 6 Sealing ring

- 7 Hollow screw
- 8 Sealing ring
- 9 O-ring
- 10 Hose clamp
- 11 Fuel expanding hose
- 12 Return line

- 13 Overflow valve
- 14 Fuel line
- 15 Fuel line
- 16 Fuel filter top
- 17 Fuel filter
- 30 Injection pump

B. Engine 615, 616, 617 MW and M/RSF-injection pump with mechanical governor

Model	Engine	Injection pump Bosch designation (abbreviation)	Governor Bosch designation	Delivery pump Bosch designation	Test values ¹⁾ MB-sheet Date or edition
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Standard version and (AUS) (J)

123.1	615.940	PES 4 M 50 C 320 RS 103 (M/RSF)	⁴⁾	FP/K 22 M 101	2,0 g 2,0 g 1 2,0 g 2 2,0 g 3 2nd edition
	616.912 ²⁾	PES 4 MW 55/320 RS 17 (MW)	RW 375/2250 MW 23	FP/K 22 MW 7	2,4 g 2nd edition
	616.912 ³⁾	PES 4 M 55 C 320 RS 104 (M/RSF)	⁴⁾	FP/K 22 M 101	2,4 h 2,4 h 1 3rd edition
	616.912	PES 4 M 55 C 320 RS 107 (M/RSF)	⁴⁾	FP/K 22 M 101	2,4 h 1 3rd edition
115.1	617.910	PES 5 MW 55/320 RS 3 (MW)	RW 350/2200 MW 2	FP/K 22 MW 3	3,0 a 4th edition
123.1	617.912	PES 5 MW 55/320 RS 12 (MW)	RW 350/2200 MW 15	FP/K 22 MW 7	3,0 d 5th edition
		PES 5 M 55 C 320 RS 105 (M/RSF)	⁴⁾	FP/K 22 M 101	3,0 l 3rd edition
		PES 5 M 55 C 320 RS 108 (M/RSF)	⁴⁾	FP/K 22 M 101	3,0 l 1st version

¹⁾ Accurate regulation and adjustment of injection pump is possible on an injection pump test bench only. For workshops which own such a test bench, the required data sheets for the various pumps are available.

²⁾ Production starting chassis end no. 054194, October 1977.

³⁾ Production starting chassis end no. 084808, August 1978.

⁴⁾ Governor designation is included in injection pump combination number.

(E) (S)

Identification (S) injection pump only with lead-sealed governor housing and full load stop screw (on MW-injection pump only)

Model year 1975/76

115.1	617.910	PES 5 MW 55/320 RS 3 (MW)	RW 350/2200 MW 10	FP/K 22 MW 3	3,0 a 4th edition
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Model year 1977/78

123.1	616.912	PES 4 MW 55/320 RS 17 (MW)	RW 375/2250 MW 24	FP/K 22 MW 7	2,4 g 2nd edition
	617.912	PES 5 MW 55/320 RS 12 (MW)	RW 350/2200 MW 20		3,0 e 4th edition

Starting model year 1979

123.1	615.940	PES 4 M 50 C 320 RS 103 (MRSF)	²⁾	FP/K 22 M 101	2,0 g 2 2nd edition
	616.912	PES 4 M 55 C 320 RS 104 (MRSF)	²⁾		2,4 h 1 3rd edition
	617.912	PES 5 MW 55/320 RS 12 (MW)	RW 350/2200 MW 20	FP/K 22 MW 7	3,0 l 3rd edition

¹⁾ Accurate regulation and adjustment of injection pump is possible on an injection pump test bench only. For workshops which own such a test bench, the required data sheets for the various pumps are available.

²⁾ Governor designation is included in injection pump combination number.

Model	Engine	Injection pump Bosch designation (abbreviation)	Governor Bosch designation	Delivery pump Bosch designation	Test values ¹⁾ MB-sheet Date or edition
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Model year 1980/81

Identification **(S)** only: Injection pump with lead-sealed governor housing.

123.1	615.940	PES 4 M 50 C 320 RS 103 (M/RSF)	4)	FP/K 22 M 101	2,0 g 2 2nd edition
	616.912	PES 4 M 55 C 320 RS 104 ²⁾ (M/RSF)	4)	FP/K 22 M 101	2,4 h 1 3rd edition
		PES 4 M 55 C 320 RS 107 ³⁾ (M/RSF)	4)	FP/K 22 M 101	2,4 h 1 3rd edition
	617.912	PES 5 M 55 C 320 RS 105 (M/RSF)	4)	FP/K 22 M 101	3,0 l 3rd edition
		PES 5 M 55 C 320 RS 108 ³⁾ (M/RSF)	4)	FP/K 22 M 101	3,0 l 3rd edition

1) Accurate regulation and adjustment of injection pump is possible on an injection pump test bench only. For workshops which own such a test bench, the required data sheets for the various pumps are available.

2) Starting chassis end no. 084808, August 1978.

3) Starting November 1980.

4) Governor designation is included in injection pump combination number.

(USA) (ZA)

Identification: green information plate.

Model year 1975/76

115.1	617.910	PES 5 MW 55/320 RS 4 (MW)	RW 350/2200 MW 3	FP/K 22 MW 3	3,0 c 2nd edition
	617.910 ²⁾	PES 5 MW 55/320 RS 4 (MW)	RW 350/2200 MW 11		3,0 b 2nd edition

Model year 1977/78

123.1	616.912 ³⁾	PES 4 MW 55/320 RS 14 (MW)	RW 350/2200 MW 21	FP/K 22 MW 7	2,4 f 9th edition
	617.912 ³⁾	PES 5 MW 55/320 RS 15 (MW)	RW 350/2200 MW 19		3,0 f 9th edition

Model year 1979

123.1	616.912 ³⁾	PES 4 MW 55/320 RS 14 (MW)	RW 375/2200 MW 21	FP/K 22 MW 7	2,4 f 9th edition
	617.912 ³⁾	PES 5 MW 55/320 RS 15 (MW)	RW 375/2200 MW 19		3,0 f 9th edition

Model year 1980/81

123.1	616.912 ³⁾	PES 4 MW 55/320 RS 21 (MW)	RW 375/2200 MW 27	FP/K 22 MW 21	2,4 i 1st edition
	617.912 ³⁾	PES 5 MW 55/320 RS 20 (MW)	RW 375/2200 MW 27		3,0 k 2nd edition

1) Accurate regulation and adjustment of injection pump is possible on an injection pump test bench only. For workshops which own such a test bench, the required data sheets for the various pumps are available.

2) Injection pump with mechanical altitude correction, starting chassis end no. 007590.

3) Injection pump with automatic altitude correction.

Test values

Engine	615	616, 617
Begin of delivery before TDC in compression stroke ^{1) 2)}	26°	24°

Attention!

On injection pumps with mechanical governor, push regulating lever of injection pump to full load while measuring and pull off vacuum hose from vacuum box.

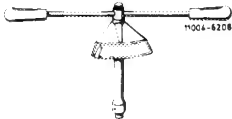




¹⁾ The injection pump is in begin of delivery position when the marking on camshaft of injection pump is in alignment with that on flange of injection pump.

²⁾ Check begin of delivery position following installation of injection pump according to overflow method and adjust (07.1–110 and 115).

Tightening torques

	Nm
Pipe connection for pressure valve	40–50
Injection line	25

Special tools

Torque wrench 1/2" square, 15–65 Nm		000 589 27 21 00
Socket wrench insert 13 mm, 3/8" square		000 589 21 07 22
Box wrench insert open, 17 mm, 1/2" square for injection lines		000 589 68 03 00
Overflow pipe		636 589 02 23 00
Socket notched tooth 17 x 20, 1/2" square for pipe connection MRSF-injection pump		617 589 01 09 00 ¹⁾

¹⁾ Machine socket 617 589 00 09 00 (refer to 07.1–210).

Self-made tool

Box wrench 13 mm	refer to Fig. item 4
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Note

On engine 617 in model 123.1, remove oil filter (18–110).

On engine 617 in model 115.1, remove battery and battery frame.

Removal

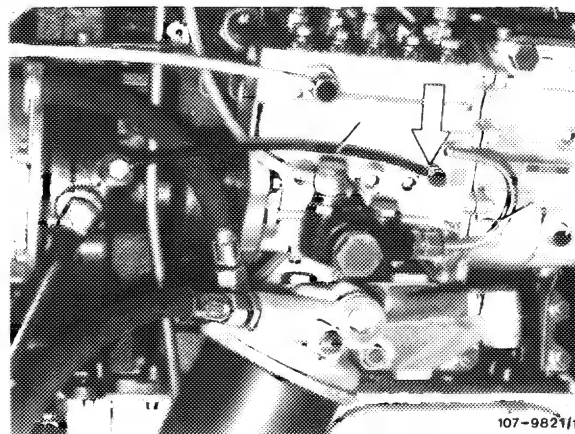
1 Pull vacuum hose on vacuum box and electric cable, disconnect regulating rod, unscrew injection lines and fuel lines on injection pump. Place closing caps on connections for injection lines and fuel hoses on injection pump.

2 On MW-injection pumps, unscrew lube oil line (5).

Attention!

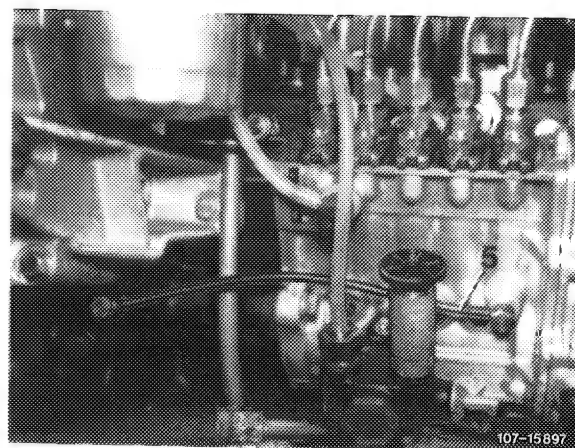
Prior to removing lube oil line (5), clean connecting points.

Model 115.1



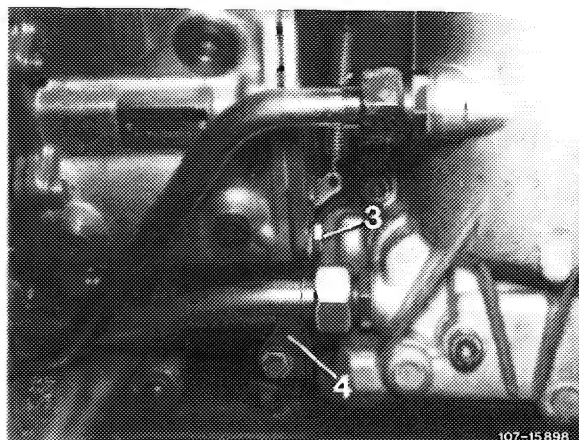
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Model 123.1



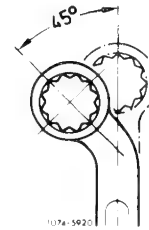
107-15897

3 Unscrew hex screws on supporting holder (4) and the three fastening nuts of injection pump. Loosen fastening screw (3) so that adjustments on slot can be made.



107-15898

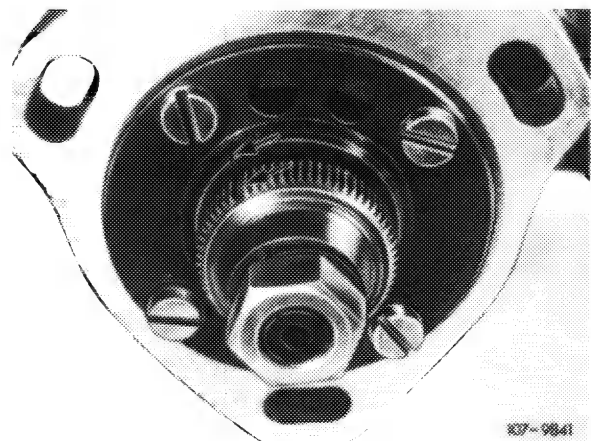
4 On engine 617 in model 115.1, use self-bent 13 mm box wrench according to drawing for loosening front fastening nuts.



5 Pull injection pump out of cylinder crankcase. Remove coupling sleeve from driver of injection pump or from drive shaft.

Note: When replacing a driver, apply counterhold with notched tooth wrench for loosening hex nut, then pull driver from injection pump shaft by means of puller. Clean shaft stub and driver; the two cones must be absolutely clean and free of grease.

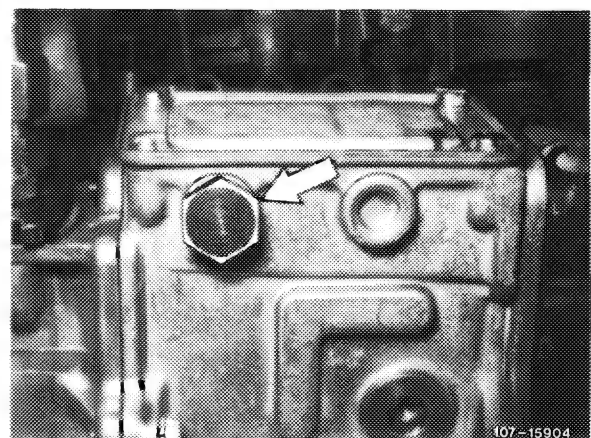
When mounting a new driver, pay attention to Woodruff key and to markings (arrows).



Installation

Prior to installing a replacement injection pump proceed as follows:

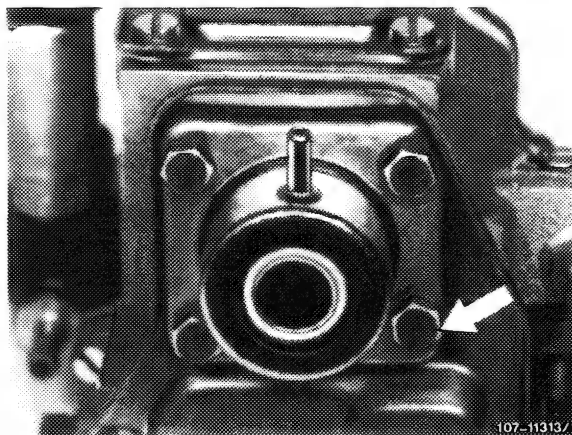
- a) For initial filling, add 0.4 liter engine oil after removing closing plug (arrow).



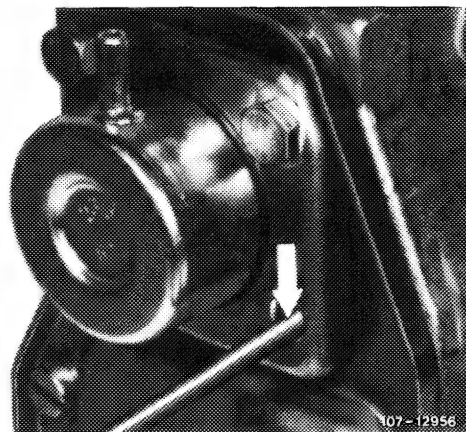
b) Check control rod for easy operation (except injection pumps with altitude adjusting box):

MW-injection pump

Unscrew lower righthand fastening screw (arrow) on shutoff box.



Insert a plug gauge through bore up to stop. Push plug gauge slightly against control rod. Move regulating lever on injection pump from idle speed to full load stop. Plug gauge should closely follow control rod.



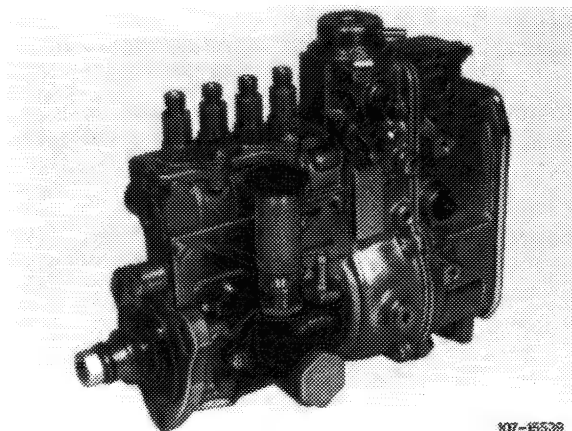
If control rod is hard to move under the influence of resinification, add clean gasoline into fuel feed connection to act on elements for a short period.

Push control rod back and forth until it is freely moving.

M/RSF-injection pump

Remove closing cap of control rod.

Move regulating lever on injection pump from idle speed to full load stop. Control rod should return automatically.



If control rod is hard to move under influence of resinification, fill clean gasoline into fuel feed connection to act on elements for a short period.

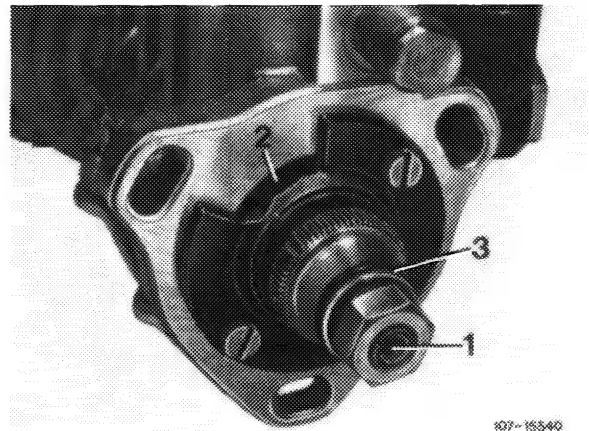
Push control rod back and forth until it is freely moving.

The injection pump receives the oil required for lubrication via intermediate gear shaft and hollow camshaft of injection pump.

The oil flows back into cylinder crankcase via ring gap (2) on sealing flange of camshaft.

For sealing coupling space between intermediate gear shaft and camshaft an O-ring (3) is inserted in drive pinion.

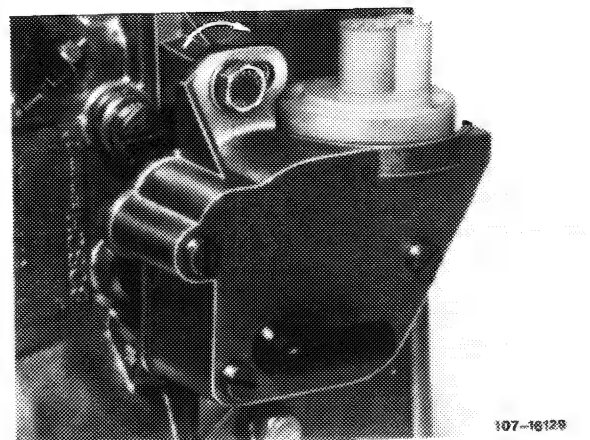
- 1 Oil inlet
- 2 Oil outlet
- 3 O-ring



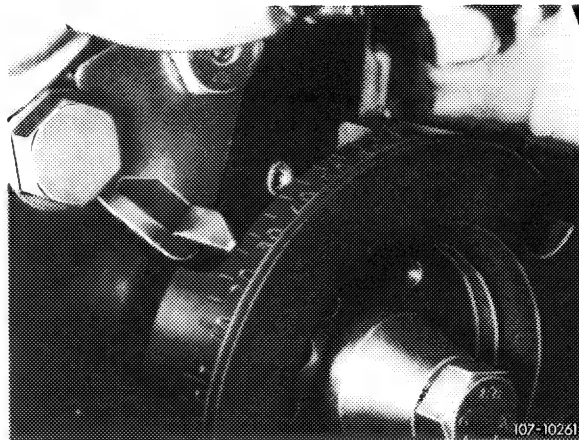
When removing and installing injection pump, make sure that the O-ring (3) is not damaged. Always replace damaged O-rings.

On vehicles with automatic transmission and vacuum control valve:

Unscrew vacuum control valve from removed injection pump, screw to injection pump about to be installed and adjust. For this purpose, push regulating lever of injection pump to full load and turn vacuum control valve to the right (arrow) up to noticeable stop. In this position, tighten fastening screws.

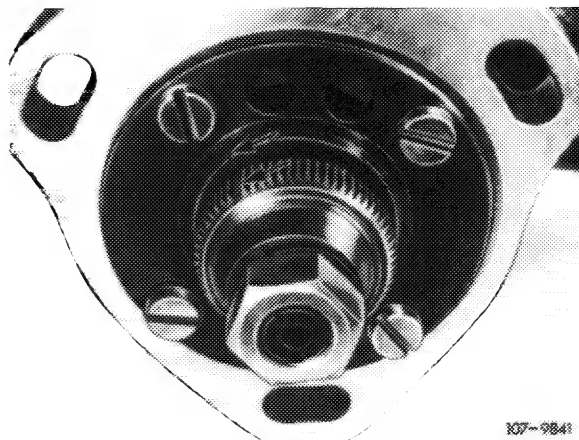


6 Set crankshaft to begin of delivery in compression stroke.



7 Mount new gasket.

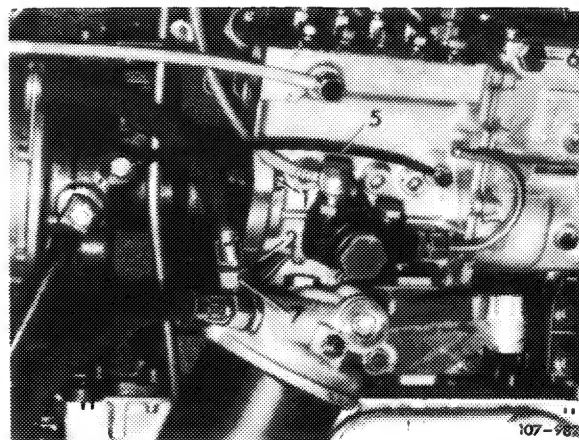
8 Set injection pump to mark. For this purpose, rotate camshaft of injection pump until marking line on camshaft is in alignment with line on flange (arrows).



9 Slip coupling sleeve on driver and introduce injection pump. Mount washers and slightly tighten injection pump by means of hex nuts.

Note: On engine 617 in model 115.1, unscrew oil hose (7) for easier access of washer and nut (2).

10 Check begin of delivery and adjust (07.1-110 and 115). Then tighten injection pump.



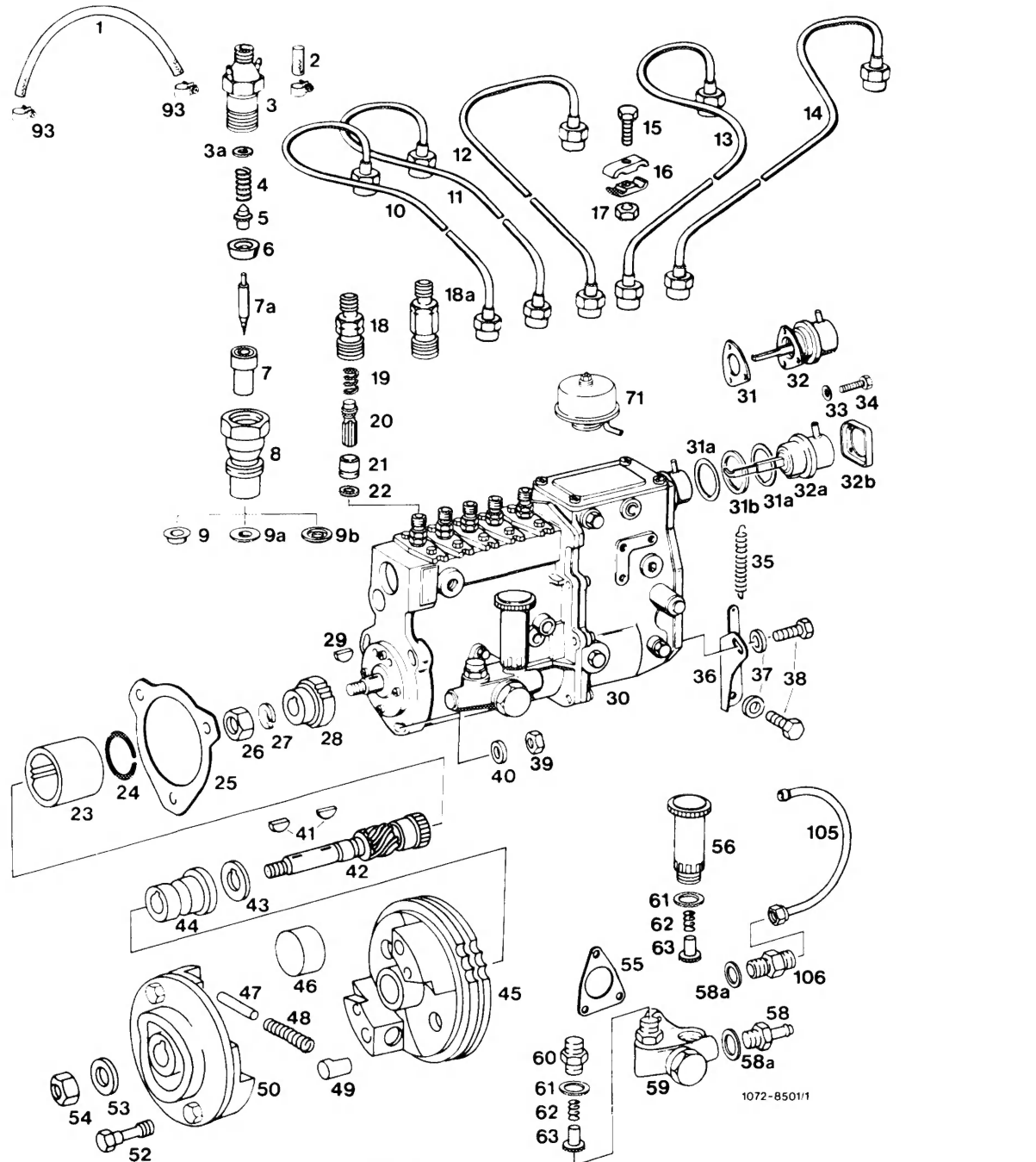
11 Take supporting holder (4) from removed injection pump.

For attaching supporting holder, use only spacing washers and hex screws intended for engine. Screw supporting holder to cylinder crankcase first, and then tighten fastening screw in oblong hole (slot) of supporting holder.

- 12 Vacuum hose on vacuum box, mount electric cable. Connect all fuel lines.
- 13 On MW-injection pumps, reattach lube oil line to injection pump.
- 14 Mount oil filter and oil filter cover with new gasket (18—110).
- 15 Mount battery frame and battery and connect.
- 16 Vent injection system with manual delivery pump (07.1—140).
- 17 Check regulating linkage and adjust, if required (30—300).
- 18 Run engine to operating temperature and check all connections for leaks.
- 19 Check idling speed and adjust, if required (07.1—100).

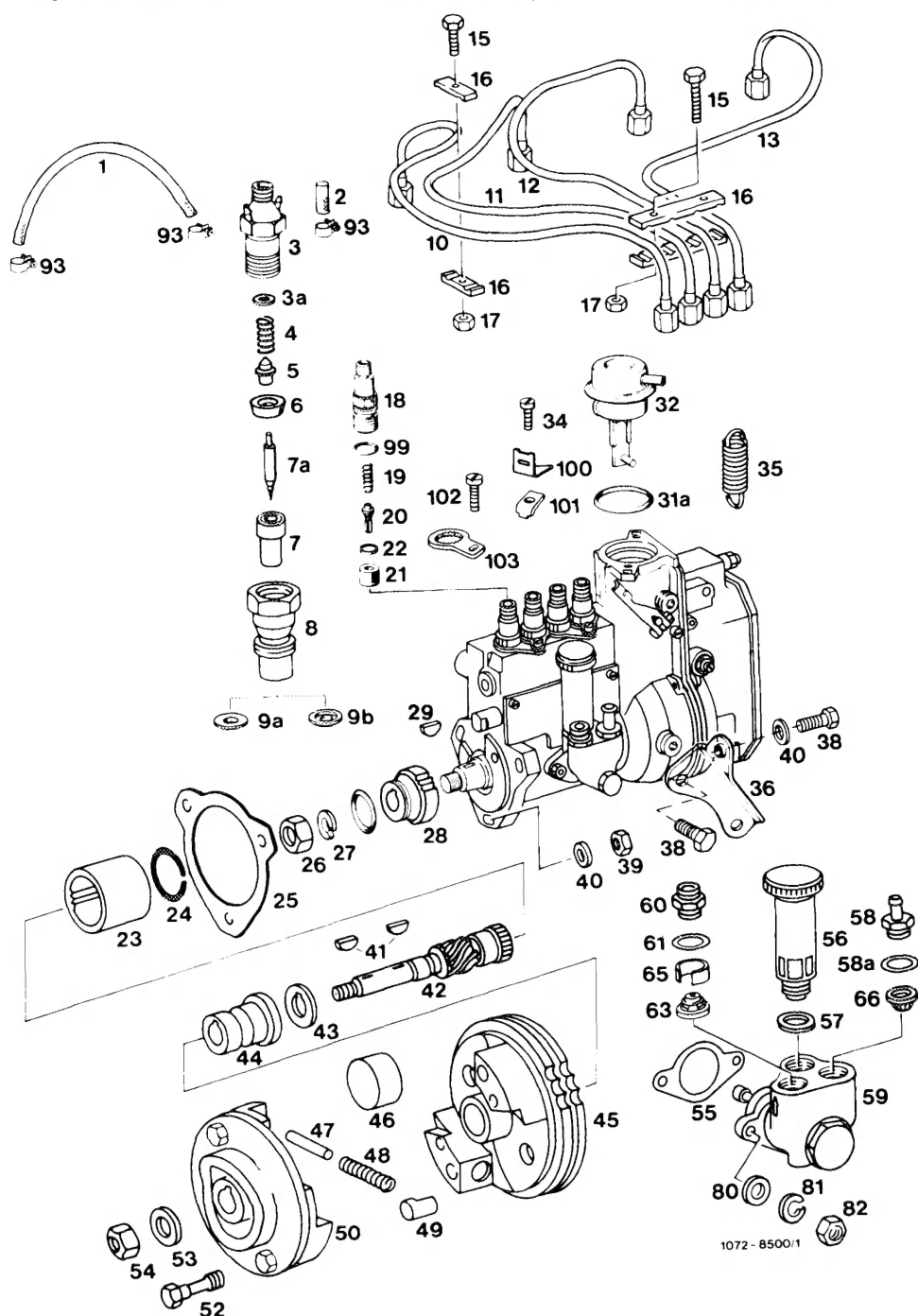
Mixture preparation

Engine 616, 617 MW-injection pump with mechanical governor



- | | | |
|--------------------------------------|--|---------------------------------------|
| 1 Leak hose | 22 Copper sealing ring | 42 Intermediate gear shaft |
| 2 Closing plug | 23 Sleeve | 43 Thrust ring |
| 3 Injection nozzle holder top | 24 Circlip | 44 Bushing |
| 3a Steel washer | 25 Gasket | 45 Segment for injection timer |
| 4 Compression spring | 26 Nut | 46 Governor weight |
| 5 Pressure pin | 27 Snap ring | 47 Bolt |
| 6 Nozzle holder insert | 28 Drive pinion | 48 Compression spring |
| 7 Nozzle body | 29 Woodruff key | 49 Bolt |
| 7a Nozzle needle | 30 Injection pump | 50 Segment flange |
| 8 Injection nozzle holder lower half | 31 Gasket | 52 Collar screw |
| 9 Small nozzle plate 1st version | 31a Gasket | 53 Washer |
| 9a Small nozzle plate 2nd version | 31b Steel washer | 54 Nut |
| 9b Small nozzle plate 3rd version | 32 Vacuum control unit engine 617 in model 115 | 55 Gasket |
| 10 Injection line | 32a Vacuum control unit engine 616, 617 in model 123 | 56 Fuel hand delivery pump |
| 11 Injection line | 32b Flange | 58 Connection |
| 12 Injection line | 33 Washer | 58a Sealing ring |
| 13 Injection line | 34 Screw | 59 Fuel delivery pump |
| 14 Injection line | 35 Return spring | 60 Screw connection |
| 15 Screw | 36 Holder | 61 Sealing ring |
| 16 Pipe holder | 37 Washer | 62 Compression spring |
| 17 Nut | 38 Screw | 63 Delivery and suction valve |
| 18 Pipe connection | 39 Nut | 71 Altitude adjusting box USA version |
| 18a Pipe connection USA version | 40 Washer | 93 Hose clamp Sweden version |
| 19 Compression spring | 41 Woodruff key | 105 Fuel line |
| 20 Delivery valve | | 106 Screw connection |
| 21 Delivery valve carrier | | |

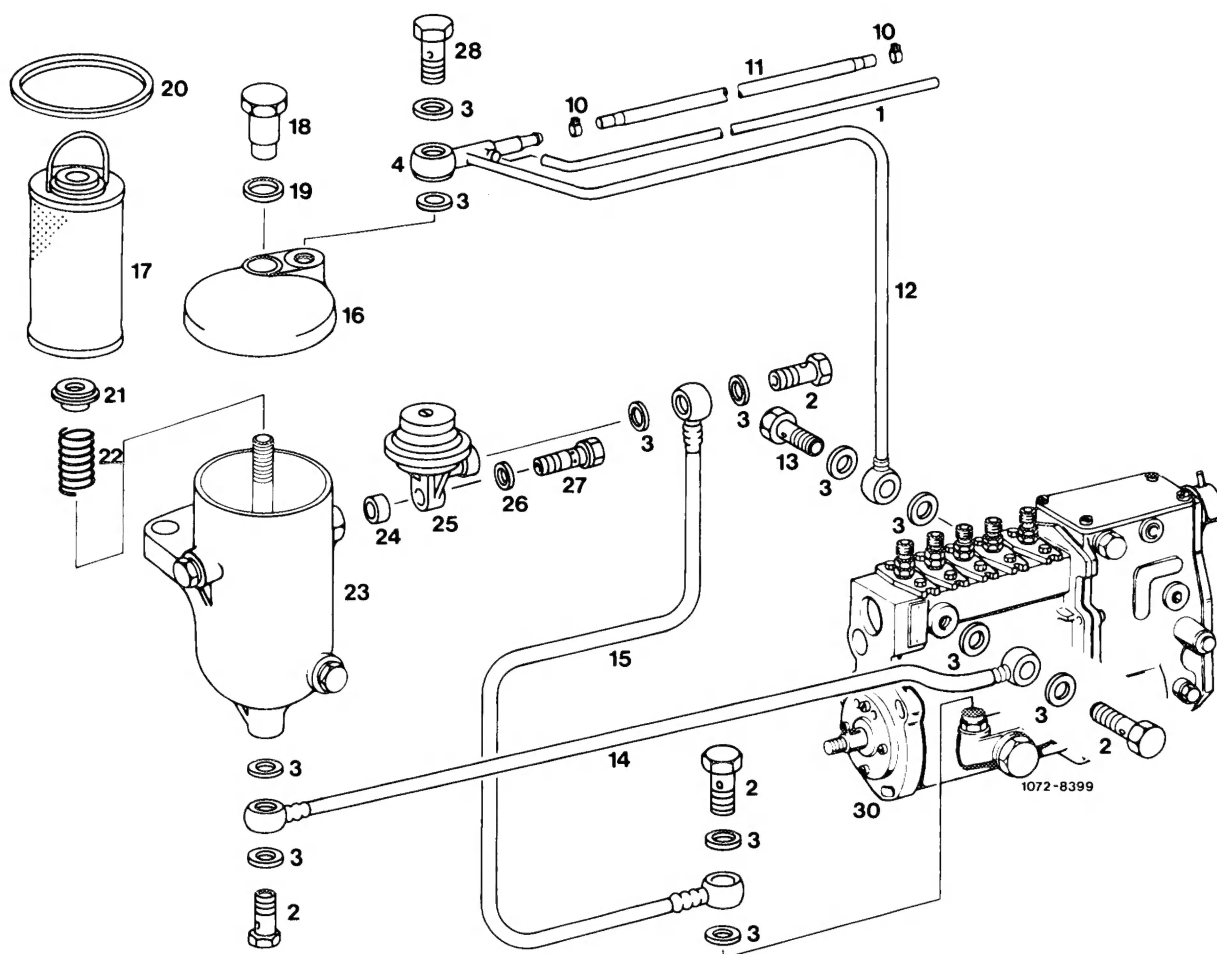
Engine 615, 616, 617 M/RSF-injection pump with mechanical governor



1072 - 8500/1

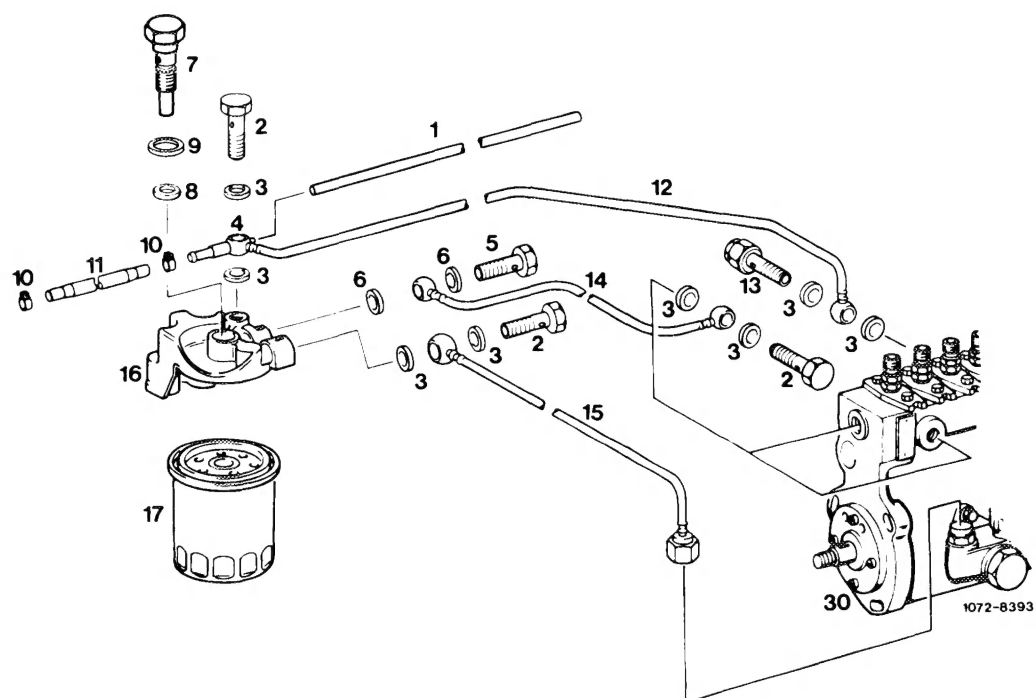
- | | | |
|----------------------------------|--------------------------------|-----------------------------|
| 1 Leak hose | 25 Gasket | 62 Collar screw |
| 2 Closing plug | 26 Nut | 63 Washer |
| 3 Injection nozzle holder top | 27 Snap ring | 64 Nut |
| 4 Compression spring | 28 Drive pinion | 65 Gasket |
| 5 Pressure pin | 29 Woodruff key | 66 Fuel hand delivery pump |
| 6 Nozzle holder insert | 30 Injection pump | 67 Rubber sealing ring |
| 7 Nozzle body | 31a O-ring | 68 Connection |
| 7a Nozzle needle | 32 Vacuum control unit | 68a Sealing ring |
| 8 Injection nozzle holder bottom | 34 Screw | 69 Fuel delivery pump |
| 9a Small nozzle plate | 35 Return spring | 60 Screw connection |
| 10 Injection line | 36 Holder | 61 Sealing ring |
| 11 Injection line | 38 Screw | 63 Delivery valve |
| 12 Injection line | 41 Woodruff key | 65 Holder |
| 13 Injection line | 42 Intermediate gear shaft | 66 Suction valve |
| 15 Screw | 43 Thrust ring | 80 Washer |
| 16 Pipe holder | 44 Bushing | 81 Snap ring |
| 17 Nut | 45 Segment for injection timer | 82 Nut |
| 18 Pipe connection | 46 Governor weight | 93 Hose clip Sweden version |
| 19 Compression spring | 47 Bolt | 99 O-ring |
| 20 Delivery valve | 48 Compression spring | 100 Holder |
| 21 Delivery valve carrier | 49 Bolt | 101 Fastening plate |
| 22 Copper sealing ring | 50 Segment flange | 102 Screw |
| 23 Sleeve | | 103 Locking plate |
| 24 Circlip | | |

Fuel filter
Engine 617 in model 115.1



- | | | |
|---------------------------------|------------------------|--------------------------------------|
| 1 Leak hose of injection nozzle | 14 Fuel line | 22 Compression spring |
| 2 Hollow screw | 15 Fuel line | 23 Fuel filter bottom |
| 3 Sealing ring | 16 Fuel filter top | 24 Spacing ring |
| 4 Ring fitting | 17 Fuel filter element | 25 Fuel manual delivery pump |
| 10 Hose clamp | 18 Screw | 26 Sealing ring |
| 11 Fuel expanding hose | 19 Sealing ring | 27 Hollow screw |
| 12 Return line | 20 Rubber sealing ring | 28 Hollow screw with calibrated bore |
| 13 Overflow valve | 21 Spring retainer | 30 Injection pump |

Engine 615, 616, 617 in model 123.1



- 1 Leak hose of injection nozzle
- 2 Hollow screw
- 3 Sealing ring
- 4 Ring fitting
- 5 Hollow screw
- 6 Sealing ring

- 7 Hollow screw
- 8 Sealing ring
- 9 O-ring
- 10 Hose clamp
- 11 Fuel expanding hose
- 12 Return line

- 13 Overflow valve
- 14 Fuel line
- 15 Fuel line
- 16 Fuel filter top
- 17 Fuel filter
- 30 Injection pump